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EFFECT OF INCENTIVE AND COMPLEXITY ON PERFORMANCE OF STUDENTS FROM TWO SOCIAL CLASS BACKGROUNDS ON A CONCEPT IDENTIFICATION TASK.

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THE EFFECTS OF INCENTIVE, SOCIAL CLASS, AND TASK COMPLEXITY ON PERFORMANCE IN A CONCEPT IDENTIFICATION TASK WERE INVESTIGATED. CONCEPT IDENTIFICATION PROBLEMS AT THREE LEVELS OF COMPLEXITY (ONE, TWO, OR THREE BITS OF RELEVANT INFORMATION) UNDER THREE INCENTIVE CONDITIONS (MONETARY INCENTIVE, SYMBOLIC INCENTIVE, OR NO-INCENTIVE CONTROL) WERE PRESENTED TO 180 JUNIOR HIGH SCHOOL STUDENTS FROM BOTH HIGH AND LOW SOCIOECONOMIC STATUS (SES) LEVELS. IT WAS FOUND THAT (1) THE HIGH SES SUBJECTS PERFORMED SIGNIFICANTLY BETTER THAN THE LOW SES SUBJECTS, (2) PERFORMANCE DECREASED AS TASK COMPLEXITY INCREASED FROM ONE TO TWO BITS OF RELEVANT INFORMATION, BUT NO FURTHER PERFORMANCE DECREASE WAS OBSERVED WHEN COMPLEXITY WAS INCREASED FROM TWO TO THREE BITS OF RELEVANT INFORMATION, AND (3) THERE WAS NO DIFFERENCE IN THE NUMBER OF CORRECT RESPONSES AMONG THE THREE INCENTIVE GROUPS. IN ADDITION, NO RELATIONSHIP WAS FOUND BETWEEN SES AND THE NATURE OF THE INCENTIVE USED. (GD)

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RESEARCH AND DEVELOPMENT CENTER FOR LEARNING AND RE-EDUCATION

Technical Report No. 10

EFFECT OF INCENTIVE AND COMPLEXITY ON PERFORMANCE OF STUDENTS FROM TWO SOCIAL CLASS BACKGROUNDS ON A CONCEPT IDENTIFICATION TASK

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Based on a master's thesis under the direction of
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Research and Development Center
for Learning and Re-Education
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PREFACE

This technical report is based on the master's thesis of Marcus C. S. Fang. Members of the thesis committee were Herbert J. Klausmeier, Chairman; Arthur W. Staats; and Edward A. Nelson.

The primary goal of the R & D Center for Learning and Re-Education is to improve cognitive learning in children and adults, commensurate with good personality development. Knowledge is being extended about human learning and other variables associated with efficiency of school learning. This operation is being performed through synthesizing present knowledge and through conducting research to generate new knowledge. In turn, the knowledge is being focused upon the three main problem areas of the Center: developing exemplary instructional systems, refining the science of human behavior and learning on the one hand and the technology of instruction on the other, and inventing new models for school experimentation, development activities, etc.

One of the Center's major programs of research on human learning is in the area of concept learning. A taxonomy of variables in concept learning has been developed and a series of studies begun to clarify the effects of the variables and their relationships. In this investigation of variables from three classes—motivation, stimulus, and organismic—Mr. Fang extended the use of materials previously used with subjects of college age to junior high school age subjects. The expected superior performance of high socio-economic level subjects was obtained but the lack of relationship between socioeconomic level and type of incentive led Mr. Fang to conclude that more research on incentives is necessary, particularly on the conditions under which incentives operate effectively.

Herbert J. Klausmeier
Co-Director for Research

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ABSTRACT

Previous studies have suggested that a relationship exists between socio-economic status (SES) and the nature of the incentive used. Lower SES children perform better when given material rather than nonmaterial incentives while the opposite is true of higher SES children. This study attempted to find out whether the above-mentioned relationship would hold for concept identification tasks and with adolescent subjects (Ss).

One hundred eighty junior high school students from two SES levels (high versus low) solved concept identification problems at three levels of complexity (1, 2, or 3 bits of relevant information) under three incentive conditions (monetary incentive, symbolic incentive, and no-incentive control). The Ss were shown the minimum number of stimulus slides which uniquely defined the concept and were asked to categorize the test slides which followed as either belonging or not belonging to the concept. Correct responses on the categorization task constituted the dependent variable. Ss also responded to a posttest questionnaire designed to evaluate the success of the incentive manipulation as well as to assess the attitudes of Ss towards working for a reward versus working for the fun of it.

The major results were: (a) The performance of the high SES Ss was significantly better than that of the low SES Ss. (b) As task complexity increased from 1 to 2 bits of relevant information, performance decreased. No further decrease was observed, however, when complexity was increased from 2 to 3 bits of relevant information. (c) There was no difference in the number of correct responses made by Ss in the three incentive groups. The expected incentive × SES interaction also failed to materialize.

I
INTRODUCTION

A major goal of educators and educational psychologists is the improvement of efficiency of learning in the schools. In pursuit of this goal, investigators have identified a number of variables which affect performance. These variables have included incentives, learner characteristics, and the nature of the experimental tasks. The results of research on these variables, however, have not been entirely consistent.

Inquiries into the effects of incentives on performance have varied a great deal. The incentives used have included symbolic incentives, such as praise or tokens, and material incentives, such as candy, toys, or money. A number of studies have compared the relative efficacy of material versus symbolic incentives (Terrell & Kennedy, 1957; Zigler & de Labry, 1962). Other studies have compared the relative effectiveness of different amounts of material incentives, especially monetary incentives (Miller & Estes, 1961; Kalish, 1966). Various types of tasks, ranging from serial learning to concept identification, have been used. Also, a variety of subjects (Ss) have been employed. It is not surprising, therefore, that there is a lack of unanimity among these findings. For example, several of the studies (e.g., Bergum & Lehr, 1964) found that monetary incentives facilitated performance, while others (e.g., Pavlik, 1957) failed to find any significant effect of monetary incentives on performance. These discrepant results clearly indicate that additional research should be done on the effects of incentives.

One of the learner characteristics which has received much attention is the socioeconomic status (SES) of the S. Investigations of the effects of SES on performance have also yielded somewhat conflicting results. Estes (1956) found that Ss' performance was not affected by their SES. However, Siller (1957) and Findley and McGuire (1957) showed that children from high social-class backgrounds performed better than children from lower-class backgrounds. These divergent results indicate that further research is needed on the effect of social class.

A number of studies have suggested that material and nonmaterial incentives exert differential effects on children from different social-class backgrounds. Terrell, Durkin, and Wiesley (1959) have demonstrated that lower-class children learned more efficiently when given a material incentive than when given a symbolic incentive, while the opposite was true of the middle-class children. The implication for efficient learning is far-reaching if the relationship (between social class and types of incentives) holds for classroom situations; hence a test of the Terrell et al. findings seems desirable.

Differences in experimental findings have often been traced to the differences in the characteristics of the tasks used; therefore, the nature of the learning task is an important variable. In addition to being influenced by between-tasks differences, experimental outcomes can also be influenced by within-task differences, such as the level of complexity in a concept identification task. Research on the effects of task complexity has generally shown that performance deteriorates when complexity increases (e.g., Brown & Archer, 1956; Bourne, 1963). There is, as yet, no study which investigates the effect of incentives on performance when the complexity of the task is varied. It is conceivable that task complexity will interact with incentives such that the effect of incentives increases as complexity increases. By varying the incentive levels, social class, and task complexity in a systematic manner, it is hypothesized that the effects of these three important variables can be detected separately and collectively.

The purpose of this experiment is to investigate the effects of incentives and complexity on performance of students from two SES levels on a concept identification task. Specifically,

the questions which this experiment seeks to answer are:

1. What is the relationship between SES and performance in a concept identification task?
2. What is the effect of an incentive upon the performance of Ss in a concept identification task?
3. What is the effect of the complexity of the task on the performance of Ss on a concept identification task?
4. Which of the following interactions are significant?

   (a) Interaction of incentive by SES.
   (b) Interaction of incentive by complexity.
   (c) Interaction of SES by complexity.
   (d) Interaction of incentive by SES by complexity.

II
REVIEW OF RELATED LITERATURE

The purpose of this experiment is to investigate the effects of incentive, social class, and task complexity on performance in a concept identification task. The following types of studies will, therefore, be covered in this review: those which investigated the effects of incentives on performance in various experimental tasks; those which compared the performance of Ss from different social-class backgrounds under different incentive conditions; and those dealing with the effects of task complexity on concept identification.

INCENTIVES

Studies which treat incentive as an independent variable essentially have dealt with four types of conditions: material incentives, symbolic incentives, feedback (or knowledge of results), and a no-incentive condition. Comparisons are usually made between the no-incentive condition and one or more of the others. The results of these studies have been equivocal—some indicated one type of incentive to be superior to another or to the no-incentive condition while others showed no difference among the incentive conditions.

The following studies have shown that monetary incentives do facilitate performance on certain types of tasks. In an investigation of the effect of monetary incentive on visual discrimination, Holston (1950) found that increasing the incentives resulted in a lowered intensity threshold. Bergum and Lehr (1964) engaged 40 Air Force trainees in a visual vigilance task and found that giving Ss 20 cents for every correctly identified signal significantly facilitated vigilance. The authors noted, however, that the facilitative effect was short-lived and that the incentive, when withdrawn, could in fact be detrimental to performance. Bahrick (1954) offered college students amounts ranging from 10 cents to $1.50, depending on their performance in a serial learning task. It was found that Ss who were offered a monetary reward for efficient learning of relevant cues (i.e., forms of the figures) displayed significantly better learning than Ss in the control group. There was no difference, however, between the two groups in incidental learning (i.e., recognizing the color associated with each form). Working with seventh and eighth graders, Kausler, Laughlin, and Trapp (1963) found that Ss receiving incentives displayed significantly more incidental learning as well as relevant learning. Harley (1965) reported that Ss who were offered 25 cents for each correct response on a paired associate learning task performed significantly better than the control group of Ss. Although a variety of tasks and age levels were used, all these studies found that monetary incentives did have a facilitative effect on performance.

In contrast to the studies which demonstrated a facilitation effect due to monetary incentives, the following studies have reported no significant incentive effects. The Ss in Pavlik's (1957) experiment were asked to construct triangular models from tinkertoy parts, and a prize of $15.00 was offered to the group with the greatest output. Results showed that there was no difference in the number of models built by the experimental and control groups. Crawford and Sidowski (1964) offered various amounts of money to the three pairs of Ss who accumulated the greatest number of points in a game situation. No significant effect due to incentives was found in this experiment. Burday (1963) compared the performance of schizophrenics, brain-damaged, and non-psychiatric patients on two concept-identification tasks. The motivational treatment consisted of the promise of money if Ss expended effort and performed well on the second task. Results showed no significant improvement due to the motivating instructions. Thus, all three studies failed to find any significant effect due to monetary rewards.

A number of studies have compared the relative efficacy of monetary versus other types of incentives as well as different levels of mone-

tary incentive. Results of these studies have not been in agreement, either. Abel (1936) had nine-year-olds learn a simple finger maze. The Ss were randomly assigned to four incentive conditions: no reward, a verbal reward, a one-penny reward, and a promise of 25 cents upon satisfactory completion of the task. Efficiency of learning was found to be in the reverse order of the conditions listed. Lintz and Brackbill (1966) used college students in discrimination and paired-associate tasks and found that Ss rewarded with money did not learn more efficiently than Ss who received only feedback. An experiment by Miller and Estes (1961) made two comparisons simultaneously: (1) between the effectiveness of monetary incentives and of knowledge of results and (2) between two levels of monetary incentives. Nine-year-olds were asked to discriminate between drawings of faces (tachistoscopically presented for two seconds) which differed only in the height and spacing of the eyebrows. One group of Ss received 1 penny for each correct response, a second group received 50 pennies per correct response, and the third group were only told whether they were right or wrong. In terms of the number of errors committed, the 1-cent and 50-cent groups did not differ. The authors were puzzled by the finding that the monetarily rewarded Ss made significantly more errors than the Ss who received feedback. On the basis of observations made during the experiment, they offered the suggestion that preoccupation with the money constituted a sort of interpolated task, hence the inferiority of the reward groups.

Kalish (1966) compared the effects of two levels of monetary incentive ($1.25 versus $2.50) on performance in a concept identification task (which was similar to that used in the present experiment). She found that the performance of the Ss who received high monetary incentives did not differ from that of the Ss in the low monetary incentive group. She cautioned, however, against a definite conclusion based on the results because (1) the two levels of monetary incentives offered might not have been really different and (2) the verbal manipulation of the incentives might not have been effective.

Since the results of the incentive studies reviewed are not entirely consistent, any attempt to draw generalizations with regard to the effect of monetary incentive must take into consideration the variations in the experimental tasks and characteristics of the Ss. For instance, the different outcomes of the Abel (1936) study and the Miller and Estes (1961) study might be accounted for by the different experimental tasks used. The different results obtained in the Bahrick (1954) study and the Kausler et al. (1963) study (which used the same experimental materials) would argue that the characteristics of the S are important factors. It must be noted, too, that many of the incentive studies reviewed thus far have investigated not just the effect of incentive but rather a combination of incentive and feedback, for inherent in each reward is the information that the S had responded correctly. Conversely, a response followed by no reward would indicate to the S that he had responded incorrectly. Therefore, what was being compared in a typical experiment was the efficacy of incentive plus feedback versus feedback or no feedback at all. In the concept identification task used in the present experiment, the S has little or no idea of how he is doing during the experiment. Thus, if the S's performance is better under the incentive condition than under the control condition, one can more confidently attribute the difference to the effect of the incentive since no feedback is involved.

SOCIOECONOMIC STATUS

As in the incentive findings, there are also disagreements among studies which looked into the role of social class background in human learning. A majority of studies, however, indicate that higher SES children are better at solving problems than low SES children.

Siller (1957, 1958) compared the performance of sixth graders from high social-class backgrounds with those from low social-class backgrounds on tests which required conceptual thinking. He found that the high SES children scored better than the low SES children on all tests of conceptual ability, especially on tests involving verbal materials. He also found that, on the whole, the high SES children tended to select abstract answers more frequently than the low SES children. It must be noted, however, that the average IQ of the two status groups was significantly different, the difference being in favor of the high SES children.

Findlay and McGuire (1957) felt that the poorer performance of the lower SES children might have been due to their lower intellectual ability and to the fact that they were less familiar with the tasks. They, therefore, gave lower and middle SES children with similar IQ's block-sorting problems involving concepts of equal familiarity to the two groups, but still

the middle SES Ss performed significantly better than the lower SES Ss, suggesting an effect due to social class independent of intellectual ability. This ability difference between the high status Ss and the low status Ss was also reported by Graham, Ernhart, Craft, and Berman (1963). Normal preschool children were administered tests of vocabulary skill, conceptual ability, perceptual-motor ability, and personality characteristics. The results indicated that higher SES children performed significantly better than the low SES children on a block-sorting (conceptual ability) test and a copy-forms (perceptual-motor) test. In an investigation of the acquisition of science concepts, Nelson (1958) administered four tests to fourth and sixth graders of high and low SES before and after a planned teaching program. It was found that, although it did not differentiate pupils' amount of improvement, SES was directly related to the performance level both before and after the program of instruction; in both cases, the high SES children were superior to the low SES children in performance. The evidence cited thus far suggests that there is something about the high SES child's experiences that gives him an advantage over the lower SES child. A significant effect due to SES has, however, not been found by all studies. Estes (1956) replicated one of Piaget's experiments dealing with the formation of mathematical and logical concepts in children aged four to six and found that the performance of the middle SES Ss did not differ from that of the lower SES Ss.

The studies on social class cited so far have not manipulated motivational factors which other studies (e.g., Terrell, 1958) have shown to be important when comparing the performance of children from the two major social groups. Several investigators have noted significant effects of different types of incentives on children from the high and low social-class backgrounds. Davis (1948) used movie tickets as incentives in a "culturally fair" learning task and found that the low SES Ss performed better when they were rewarded but the incentive had a dampening effect on the performance of the high SES Ss. Douvan (1956) offered $10.00 to those Ss whose scores exceeded a certain standard in a "test" (in reality, a need-achievement measure). As expected, the need-achievement scores of the lower SES Ss were higher under the incentive than under the no-incentive conditions, whereas the need-achievement scores of the middle SES Ss were not different under the two incentive conditions. Although the fact that an individual's need to achieve is increased does not necessarily mean improved performance on a task, Douvan's result is important in that it shows that monetary incentive does increase one's motivation to do well on a task, at least as far as the lower SES Ss are concerned.

Zigler and de Labry (1962) compared the performance of retardates, lower-class, and middle-class children on a relatively simple card-sorting task under two incentive conditions (tangible versus intangible). The tangible rewards included such things as ball-point pens, combs, and toys; the experimenter saying "right" after each correct response constituted the intangible reward. It was found that retardates and lower-class children performed more effectively when a tangible rather than an intangible reward was used, while the middle-class children performed better under the intangible rather than the tangible reward condition. Another important finding was that there was no difference among the three groups in their ability to switch concepts when each group received its optimal reinforcer. The educational implication is obvious here if it can be shown that performance on a concept-switching task is equivalent to classroom performance.

The interaction between social class and the nature of the incentive has been documented in a number of studies by Terrell and his associates. Terrell and Kennedy (1957) were interested in the relative effects of material versus symbolic incentives on discrimination learning and transposition in children. Using trials to criterion in learning and correct responses in transposition as dependent variables, the investigators found that candy (material incentive) given after each correct response was more effective than symbolic incentives such as praise, tokens, and reproof in both learning and transposition. The Ss in this experiment were from a rural background. The experiment was replicated subsequently using urban, middle-class children. Terrell (1958) found that the children who received symbolic incentives learned faster than the children who received material incentives, but there was no difference in the transposition task. Terrell also administered a posttest questionnaire and he reported that middle-class children tended to agree more with the statement, "I would rather do something for the fun of it," while the lower-class children tended to respond more often to the item, "I would rather do something if I am promised something for doing it." The findings of the above two experiments and the posttest questionnaire led Terrell, Durkin,

and Wiesley (1959) to predict an interaction between social class and the nature of an incentive. The task and the procedure were similar to that of the two previous experiments; after each correct response on the discrimination task, the S received either a light-flash (symbolic incentive) or a light-flash and a piece of candy (material incentive). The experimenters reported that the lower-class Ss learned better under the material incentive condition than under the symbolic incentive condition whereas the middle-class children performed equally well under both incentive conditions.

In the present study, which sought to test the generality of the Terrell et al. findings, money and a certificate of merit were used to represent material and symbolic incentive respectively. Money was selected to represent material incentive because it has been paired most consistently with primary reinforcers in the reinforcement history of most children. Most children have had experiences in which they were promised a certain sum of money if they would perform a certain chore. When an individual reacts to the promise by performing the chore well, he usually receives the money which can then be exchanged for primary reinforcers. It should be noted that in an incentive situation, the individual's receipt of money is usually preceded by a verbal promise and is contingent upon certain satisfactory behavior on his part. Such verbal promise has, through repeated pairings with the actual receipt of the incentive (money), become a strong positive conditioned stimulus which has the power to reinforce responses that result in obtaining the incentive. At the same time, the verbal promise also becomes a discriminative stimulus which controls "striving" behavior (Staats, 1964). Following this line of reasoning, one can speculate that one difference between the high and the low SES groups in this experiment would be that, while verbal instructions for both the monetary and symbolic incentives have become discriminative stimuli which control the "striving" behavior of the high SES Ss, only the verbal instructions for the monetary incentive would function effectively as a discriminative stimulus for the low SES Ss. Therefore, if the Terrell et al. findings generalized to concept identification tasks, one can expect that the low SES Ss would perform better under the monetary incentive condition than under the symbolic incentive condition whereas the high SES Ss would perform equally well under both incentive conditions.

TASK COMPLEXITY

Many researchers have looked into task complexity as it affects performance in concept identification tasks. Complexity in a concept identification task has been operationally defined in a number of ways: by increasing the amount of relevant or irrelevant information and by making this information redundant or not. A great majority of the studies published so far have varied the level of complexity by varying the amount of irrelevant information, and there is near unanimity in the finding that performance decreases with increases in amount of irrelevant information (e.g., Archer, 1962; Archer, Bourne & Brown, 1955; Bourne, 1957; Bourne & Haygood, 1960; Brown & Archer, 1956). The studies which varied the level of complexity by varying the amount of relevant information have also found that performance decreases with increases in amount of relevant information. Bourne (1963) found that Ss needed considerably more trials to reach criterion when the number of relevant attributes was increased. In a slightly different experiment, where the S was not told whether his guesses were correct or incorrect, Bourne, Goldstein, and Link (1964) obtained similar results. Subjects solved three problems, each of which contained a different number of relevant attributes (one, two, or three), under six conditions of availability of information. For the different groups, the experimenter left a different number of cards (0 to 5) before the S as he responded to the new stimuli. Results indicated that performance decreased when the number of relevant attributes increased from one to three and also that the number of relevant attributes interacted with the amount of available information. Thus, the concept is more easily attained if it contains few relevant attributes and if the S has many cards before him.

Wallach (1962) undertook to find out what "complexity" was in concept attainment. She reasoned that since "concepts are cognitive units, and. . . most concepts seem to be acquired by the unitizing of groups of other cognitive units. . .the difficulty of this unitizing depends on the number of cognitive units to be united. . ." (p. 278). Three types of problems were used in her experiment: Type I problem with one attribute relevant, Type II problem with two attributes relevant, and Type III problem with three attributes relevant to the concept. She found that Ss needed a significantly greater number of cards to reach criterion

(correctly labelling all the stimulus slides twice in succession) in Type III problems as compared to Type I and Type II problems. Peterson (1962) also indirectly showed that a task becomes more complex when the percentage of relevant dimensions increases. She based this conclusion on her finding that performance decreased as the percentage of relevant dimensions increased from 25 per cent to 75 per cent.

Archer (1954) compared the effects of independent manipulations of relevant and irrelevant information in a pattern identification task. The patterns were presented by oscilloscope and the S's task consisted of moving the four switches in front of him so that they corresponded to four of the six dimensions from which each pattern was made. It was found that Ss took more time to classify the 32 patterns when the amount of relevant information was increased, but increasing the amount of irrelevant information had no effect on the time in criterion. The second part of the results was not supported by later studies, however. As indicated earlier in this review, there is general agreement that performance becomes poorer as the amount of irrelevant as well as the amount of relevant information is increased. Fredrick (1965) also looked at the relative effects of increasing relevant versus irrelevant information on performance in a concept attainment task. In his experiment two kinds of conjunctive concepts were used—a J-2 concept (which has two relevant attributes and four irrelevant attributes), and a J-3 concept (which has three relevant attributes and three irrelevant attributes). The experimenter claimed that "the confounding of the number of relevant and irrelevant attributes has given a direct test of which of these two effects is more powerful" (p. 46). Results suggested that one bit of relevant information adds more to the complexity of the task than one bit of irrelevant information. The same findings were obtained in the Walker and Bourne (1961) study in which the experimenters reported that an increase in relevant information had a greater effect on task complexity than an equivalent increase in irrelevant information.

The empirical studies on concept identification cited so far are in agreement that task complexity can be manipulated by varying either the amount of relevant information or the amount of irrelevant information, and that the effect of increasing relevant information is greater than a corresponding increase of irrelevant information. In order to obtain optimal manipulation of the complexity factor, the present experiment will vary the number of bits of relevant information.

III
METHOD

SUBJECTS

One hundred eighty Ss were selected from the 395 students who comprise the entire seventh and eighth grade populations of a small Midwest school system. The selection procedure was as follows: six weeks before the experiment, each student filled out a questionnaire which asked for the educational level and occupation of the male parent. The questionnaires were scored following Hollingshead's (1957) Two Factor Index of Social Position (hereafter the Index). Each of the two factors in the Index has scores ranging from one to seven. The education factor is given a weight of four and the occupation factor is given a weight of seven. Thus, the theoretical low is 11 and the theoretical high is 77. Therefore, a person scoring three on the education factor and four on the occupation factor would receive a score of $3 \times 4 + 4 \times 7 = 40$ on the Index, and would be classified as belonging to Class III. The Ss in this experiment were grouped into five social classes on the basis of their scores on the Index, and a comparison made between Hollingshead's New Haven sample and the sample in this experiment. (See Figure 1.) It is interesting to note the similarity between the two samples. A distribution was also obtained from the scores of the questionnaires. The questionnaire and the distribution of scores obtained from it are in the Appendix to the thesis on which this report is based (Fang, 1966). In compiling this distribution, a total of 23 Ss were dropped; 15 of the respondents were discarded because they were living with grandparents or with widowed mothers, and 8 were dropped because they were unable to supply the necessary information. Thus, the resulting distribution is for 372 scores. From this distribution, 90 students with the lowest scores (Range 11-34) were selected as the high SES Ss and 90 students with the highest scores (Range 51-73) were selected as the low SES Ss. The remaining students (whose scores range from 35 to 50) were not utilized in the experiment.

EXPERIMENTAL MATERIALS

The stimulus materials were colored slides which contained geometric figures varying on either three, four, or five attributes, depending on the number of bits of relevant information presented. The attributes and their corresponding values were:

number of figures . . . . . . one or two
color of figures . . . . . . red or green
texture of figures . . . plain or textured

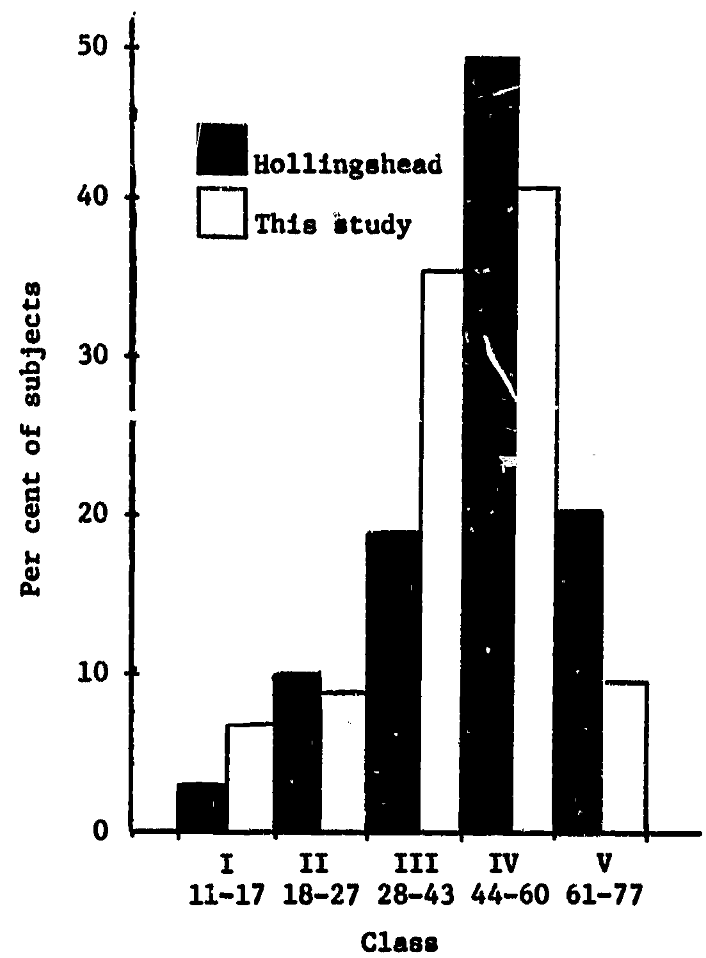

Fig. 1. Comparison between Hollingshead's sample and the sample used in this study, by class.

TABLE 1

Description of Problem Types

Problem Types	Complexity	Attributes: Relevant	Attributes: Irrelevant	Attributes: Constant	Concepts
Type I	1-bit	size	color, shape	number, texture	large
	2-bits	number, texture	color, shape	size	two, textured
	3-bits	size, number, texture	color, shape	--	one, small, textured
Type II	1-bit	number	shape, size	color, texture	two
	2-bits	color, texture	shape, size	number	plain, green
	3-bits	number, color, texture	shape, size	--	two, textured, red
Type III	1-bit	shape	number, color	texture, size	circle
	2-bits	size, texture	number, color	shape	plain, small
	3-bits	shape, size, texture	number, color	--	large, textured, square

shape of figures . . . circular or square
size of figures . . . . . . large or small

Three conjunctive concepts at the same level of complexity were prepared for each group of Ss. Complexity was defined in terms of the number of bits of relevant information contained in the problem. In the 1-bit problems, two attributes were kept constant throughout the four stimulus slides, and only the relevant attribute and the two irrelevant attributes were varied. In the 2-bits problems, one attribute was kept constant throughout the five stimulus slides, while the two relevant and the two irrelevant attributes were varied. In the 3-bits problems, all five attributes were varied in the presentation of the six stimulus slides. Subjects at each level of complexity solved three problems of different types. Problem type was defined in terms of the two irrelevant attributes which appeared in the problems across complexity levels. As shown in Table 1, Type I problems at each of the three complexity levels have in common two irrelevant attributes, color and shape. The two irrelevant attributes in Type II problems were shape and size. Number and color were the two irrelevant attributes in the Type III problems. The nine problems which were used in this experiment are listed in Table 1.

The three concepts which Ss had to identify were presented by the minimum number of stimulus slides which uniquely defined the concept (four slides in the 1-bit, five slides in the 2-bits, and six slides in the 3-bits relevant information problems). The stimulus slides were arranged so that the first slide in each series was always a positive instance of the concept and each of the following slides varied only one attribute from the first slide or the preceding slide. Positive instances of the concept were labelled YES and negative instances were labelled NO. Eight test slides followed the presentation of each series of stimulus slides. In order to control for possible response bias on the part of the Ss, half of the test slides were positive instances of the concept and half were negative instances. Since the test instances were randomly chosen from the available instances, they included some that were used as stimulus slides. The sequence in which the eight test slides were presented was randomly determined for each of the nine problems.

EXPERIMENTAL DESIGN

The experimental design used was a 2 × 3 × 3 × 3 factorial design, with two levels of SES (high versus low), three types of incentive conditions (monetary, symbolic, and no-incentive control), three levels of task complexity (1-bit, 2-bits or 3-bits relevant information), and three types of problems on which repeated measures were obtained. Subjects were randomly assigned to the 18 experimental treatment groups. (See Table 2.) Each treatment group had 10 Ss and each S solved three problems, yielding a total of 30 scores per cell.

EXPERIMENTAL PROCEDURE

The Ss were run in groups of 20, with 10 Ss from each SES level. All nine groups were run

Table 2

Experimental Design

SES	Incentive	Level of Complexity: 1-bit relevant information	2-bits relevant information	3-bits relevant information
HIGH SES	Monetary incentive	1 2 3 S_1 10 Ss : 30 scores S_{10}		
	Symbolic incentive			
	Control			
LOW SES	Monetary incentive			
	Symbolic incentive			
	Control			

within a school day. During the first class period, each participating student was handed a slip which served the dual function of an excuse slip as well as a reminder of the exact time he was to present himself to the experimental room. When all 20 Ss had reported to the experimental room at each session, each was given an answer sheet on which he was requested to write his name and grade.

The presentation of the stimulus and test slides was controlled by the Uher Dia Pilot II. Each stimulus slide was exposed for nine seconds and each test slide for seven seconds. All groups heard the following taped instructions:

> In this experiment, you will be shown a series of slides with figures on them. These figures will vary in several dimensions: they will be circular or square, red or green, large or small, plain or textured, and there will be one or two circles or one or two squares on a slide.

Your job is to determine what it is about these slides which makes them belong to a group or not belong to it. It might be that the group is made up of slides with one particular dimension in common, or some combination of these dimensions.

Let me show you an example of the five dimensions. (Show slide.) The slide you are looking at is described as one, large, textured, green, square figure. Now I'll show you the opposite. (Show slide.) This one is described as two, small, plain, red, circular figures.

What you must do is learn, after seeing four* slides, which ones do or do not belong to the group. Each of these slides will have a "yes" or a "no" on it—the "yes" means it does belong to the group, and the "no" means it does not belong. Then you will see eight different slides and you must decide for each one whether it is or is not in the group. Your score on this task will not affect your grades in your other subjects.

(Insert the appropriate incentive instructions here)

Here are the first four* slides. Watch them very carefully so you can decide what kinds of slides belong in this group. (Show stimulus slides.)

Now look at Problem 1 on your answer sheet. As you see the next eight slides, write down "yes" for those slides which belong to the group and "no" for those which do not. Please answer for each slide whether or not you are certain of the answer. (Show test slides.)

The next four* slides will help you decide what the next group is. Watch them very carefully. (Show stimulus slides.)

Now answer "yes" or "no" for every slide in Problem 2. (Show test slides.)

Here is your last group. Watch the four* slides very carefully to find out what the group is. (Show stimulus slides.)

*For 1-bit relevant information groups; changed to "five" for the 2-bit groups and "six" for the 3-bit groups.

Now answer "yes" or "no" for every slide in Problem 3. (Show test slides.)

Remember, please do not talk to anyone about this experiment. Thank you.

The following incentive instructions were received by the Monetary groups:

However, those of you who do well will be given a prize. Everyone can win this prize. All you have to do is to get two-thirds of the answers correct and you will win a prize of $1.00. Those of you who win the prize will get your money at the end of school today. Please do not talk to anyone about this experiment.

The following incentive instructions were received by Ss in the Symbolic groups:

However, those of you who do well will be given a prize. Everyone can win this prize. All you have to do is to get two-thirds of the answers correct and you will win this highly desired "Wisconsin Better Student Award." (Show slide of award.) Those of you who win this prize will get your beautiful certificates at the end of school today. Please do not talk to anyone about this experiment.

At the end of the experiment, the Ss filled out a posttest questionnaire which was designed to evaluate the success of the incentive manipulation as well as to assess the attitudes of Ss towards working for the sake of reward versus working for the fun of it. (See Appendix.) The Ss were then dismissed after they had been cautioned against discussing the experiment with anyone. The answer sheets were immediately hand-scored and those Ss in the incentive groups who got two-thirds of the answers correct were given the prize at the end of school, as promised.

TREATMENT OF THE DATA

The measurement of Ss' performance was the number of correct responses on each of the three series of eight test instances. Data were gathered from 18 groups of ten Ss each, therefore, a total of 54 means was involved in the analysis of variance. The probability of a Type I error was set at .05; effects which reached the .01 level of significance were

indicated. A post-hoc (Newman-Kuels) test was performed on each of the significant effects.

The posttest questionnaire was scored by making a frequency count of Ss' responses to the individual items in the questionnaire.

IV
RESULTS

ANALYSIS OF CORRECT RESPONSES

Performance was evaluated on the basis of the number of correct responses on the eight test instances. For each of the 18 cells there were 10 Ss each receiving three concept identification problems. The mean number of correct responses for the 18 groups is presented in Table 3. Table 4 summarizes an analysis of variance of the data.

Statistically significant main effects were obtained for SES ($p < .01$), complexity ($p < .05$), and problem type ($p < .01$). The interaction of complexity by problem type and incentive by complexity by problem type were also found to be statistically significant at the .01 and .05 levels respectively.

The mean number of correct responses for the high and low SES Ss was 6.73 and 6.21 respectively. Thus, the high SES Ss were found to be superior in performance to the low SES Ss. As illustrated in Table 3, the superiority of the high SES Ss was consistent across incentive and complexity levels; the only conditions where the superiority of the high SES S was not manifested were under the 2-bit-relevant problems for the monetary and symbolic incentive groups.

The F ratio for the main effect of task complexity was significant at the .05 level. Consequently, the differences between individual treatment means were evaluated by the Newman-Kuels procedure (Winer, 1962). Reliable evidence of task complexity was found between the 1-bit problems and the 2- and 3-bit problems. There was, however, no significant difference between the 2- and 3-bit problems. The mean number of correct responses for each level of complexity is presented in Figure 2. Here it can be seen that the 1-bit problems were easier than the 2- and 3-bit problems, but increasing the amount of relevant information from 2 to 3 bits did not increase the task complexity. In fact, a slight decrease in problem difficulty was observed.

The significant effect of problem type merely indicates that there was a difference in difficulty depending upon the particular dimen-

Table 3

Mean Number of Correct Responses of All Treatment Groups

Incentives	SES	Complexity 1	Complexity 2	Complexity 3	Incentive Means
Monetary	High	7.73	5.37	7.10	6.46
	Low	6.77	6.03	5.59	
Symbolic	High	6.77	6.03	6.47	6.32
	Low	6.47	6.30	5.87	
Control	High	7.17	6.90	6.90	6.65
	Low	6.07	6.30	6.57	
	Complexity Means	6.78	6.24	6.41	

Table 4

Summary of Analysis of Variance of Correct Responses

Source		SS	df	MS	F
Incentive	(I)	10.09	2	5.05	1.61
SES	(S)	36.30	1	36.30	11.59**
Complexity	(C)	26.67	2	13.34	4.26*
I × S		6.38	2	3.19	1.02
I × C		21.94	4	5.49	1.75
S × C		14.94	2	7.47	2.39
I × S × C		17.12	4	4.28	1.37
Ss/ I S C		507.20	162	3.13	
Problem Type	(P)	34.33	2	17.16	9.45**
I × P		11.19	4	2.80	1.54
S × P		7.53	2	3.76	2.07
C × P		37.87	4	9.47	5.21**
I × S × P		3.96	4	.99	< 1
I × C × P		36.35	8	4.54	2.50*
S × C × P		6.74	4	1.69	< 1
I × S × C × P		19.44	8	2.43	1.34
P × Ss/ I S C		588.60	324	1.82	

*p < .05

**p < .01

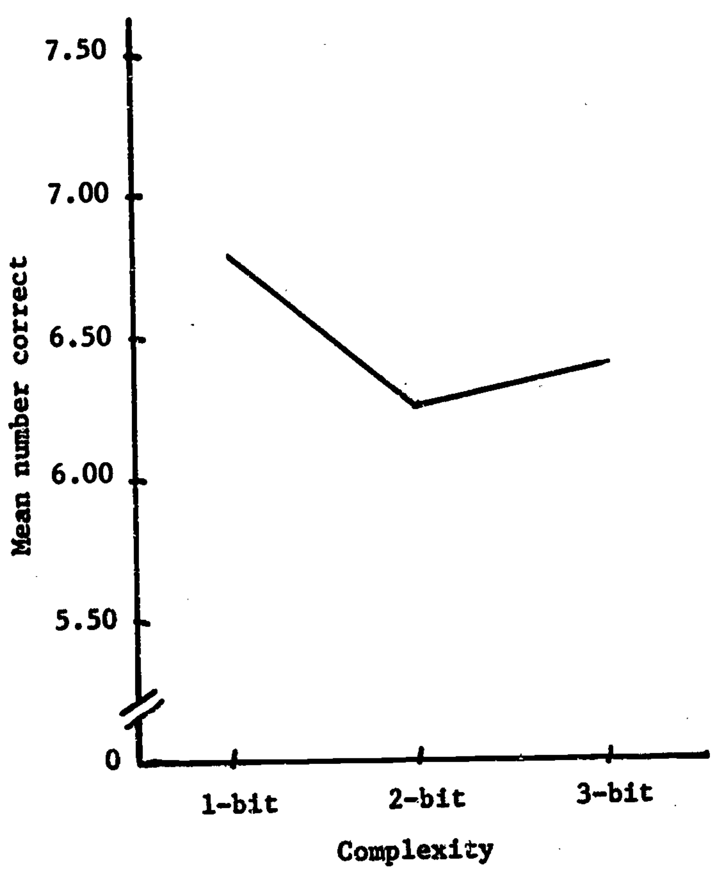

Fig. 2. Mean number of correct responses as a function of the amount of relevant information.

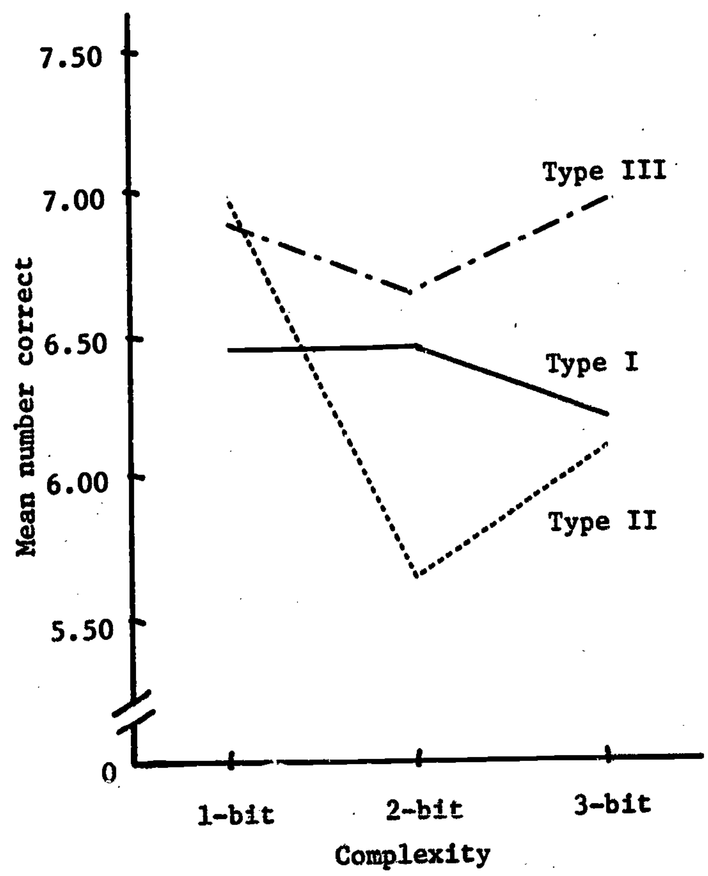

Fig. 3. Mean number of correct responses as a joint function of complexity and problem type.

Table 5

Mean Number of Correct Responses as a Function of Problem Type

Problem type	Mean correct responses	Irrelevant attributes
I	6.37	color & shape
II	6.23	shape & size
III	6.82	number & color

sions manipulated. Problem type was defined in terms of the irrelevant attributes which appeared in the problems across complexity levels. Table 5 presents the mean number of correct responses for each of the three problem types.

The Newman-Kuels procedure was used to evaluate the difference between problem type means. This analysis showed that Problem Type III was the easiest and differed significantly ($p < .01$) from Types I and II which did not differ from each other.

Data reflecting the complexity by problem type interaction are presented in Figure 3. It can be seen that the major source of variance is attributable to the large drop in performance on Problem Type II between the 1- and 2-bit complexity levels. The difference between these two means was significant at the .01 level. The means for Problem Type III also were found to differ significantly using Newman-Kuels analysis. Type III problems (in which number and color were irrelevant attributes) were unaffected when complexity increased. Performance on the Type I problems (with color and shape as irrelevant attributes) were similarly unaffected.

The incentive by complexity by problem type interaction was found to be significant at the .05 level. The data are presented in Table 6 and Figure 3. It can be seen that the major source of variability for Problem Type I is a result of the control groups' improvement with complexity, while the monetary and symbolic incentive groups' performance decreased as complexity increased. For both Problem Types II and III the major source of variability is the monetary incentive group which drops in performance between the 1- and 2-bit problems.

ANALYSIS OF POSTTEST QUESTIONNAIRE

The postttest questionnaires were scored by making a frequency tally of Ss' responses to each of the 11 items. Subjects' responses to items 1, 2, 8, 9, and 11 are summarized in the form of percentages in Table 7. Results are reported for the entire group as well as for the high and low SES groups in order to permit comparisons between the two status groups. The decision to report the results by SES was based on the fact that SES was found to be a significant factor.

Item 1 pertained to the difficulty level of the task used in the study. While 74.9% of the respondents rated the task "easy" or "very easy," 25.1% of the respondents rated the task "difficult" or "very difficult." It is interesting to note that, while the high SES Ss performed better than the low SES Ss, twice as many Ss in the high SES group rated the task "difficult."

Item 2 was concerned with the Ss' interest in the task. It was found that 94.3% of the Ss rated the experiment as either "interesting" or "very interesting." Only 5.7% of the Ss found the task "boring." Items 8 and 9 dealt with the Ss' evaluation of the incentives and their perception of the incentives' attractiveness to other participants. Data for these two items are based solely on the responses of Ss in the incentive groups. The responses to these two items were very similar, with a majority of the respondents (67.7 for Item 8 and 70.9% for Item 9) indicating that they would "very much" like to win the prize. It thus appears that the incentive manipulations were successful.

Item 11 was taken from a questionnaire which Terrell (1958) used. Results showed that the high and low SES Ss did not differ in their responses, with 90.1% of all Ss indicating that they "would rather do something for the fun of it."

Table 6

Mean Number of Correct Responses for the Incentive by Complexity by Problem Type Interaction

	Complexity								
	1 Incentive			2 Incentive			3 Incentive		
Problem Type	Mon.	Sym.	Con.	Mon.	Sym.	Con.	Mon.	Sym.	Con.
I	7.05	6.60	5.70	6.70	6.00	6.65	5.85	5.65	7.00
II	7.10	6.70	7.20	5.00	6.00	5.90	5.95	6.20	6.50
III	7.10	6.55	6.95	6.15	6.50	7.25	7.10	6.65	7.15

Mon. = Monetary
Sym. = Symbolic
Con. = Control

Table 7

Summary of Subjects' Responses to Selected Items of the Posttest Questionnaire

Items	Response alternatives	Per cent of Ss in each group checking alternative		
		High SES	Low SES	Total
(1) The experiment I have just participated in was	very easy	7.5	5.1	6.2
	easy	59.5	77.5	68.7
	difficult	31.9	16.3	23.9
	very difficult	1.1	1.1	1.2
(2) The experiment was	very interesting	37.2	28.5	32.8
	interesting	58.5	64.3	61.5
	boring	4.3	7.2	5.7
	very boring	0.0	0.0	0.0
*(8) How much do you like to win the prize?	very much	58.7	76.6	67.7
	much	30.1	15.6	22.8
	a little	11.2	6.3	8.6
	not at all	0.0	1.5	0.9
*(9) How much do you think the other participants like to win the prize?	very much	61.9	79.6	70.9
	much	36.5	20.4	28.3
	a little	1.6	0.0	0.8
	not at all	0.0	0.0	0.0
(11) I would rather do something for the fun of it		88.2	91.8	90.1
I would rather do something if I am promised something for it		11.8	8.2	9.9

*Based on the responses of the Ss in the incentive groups only.

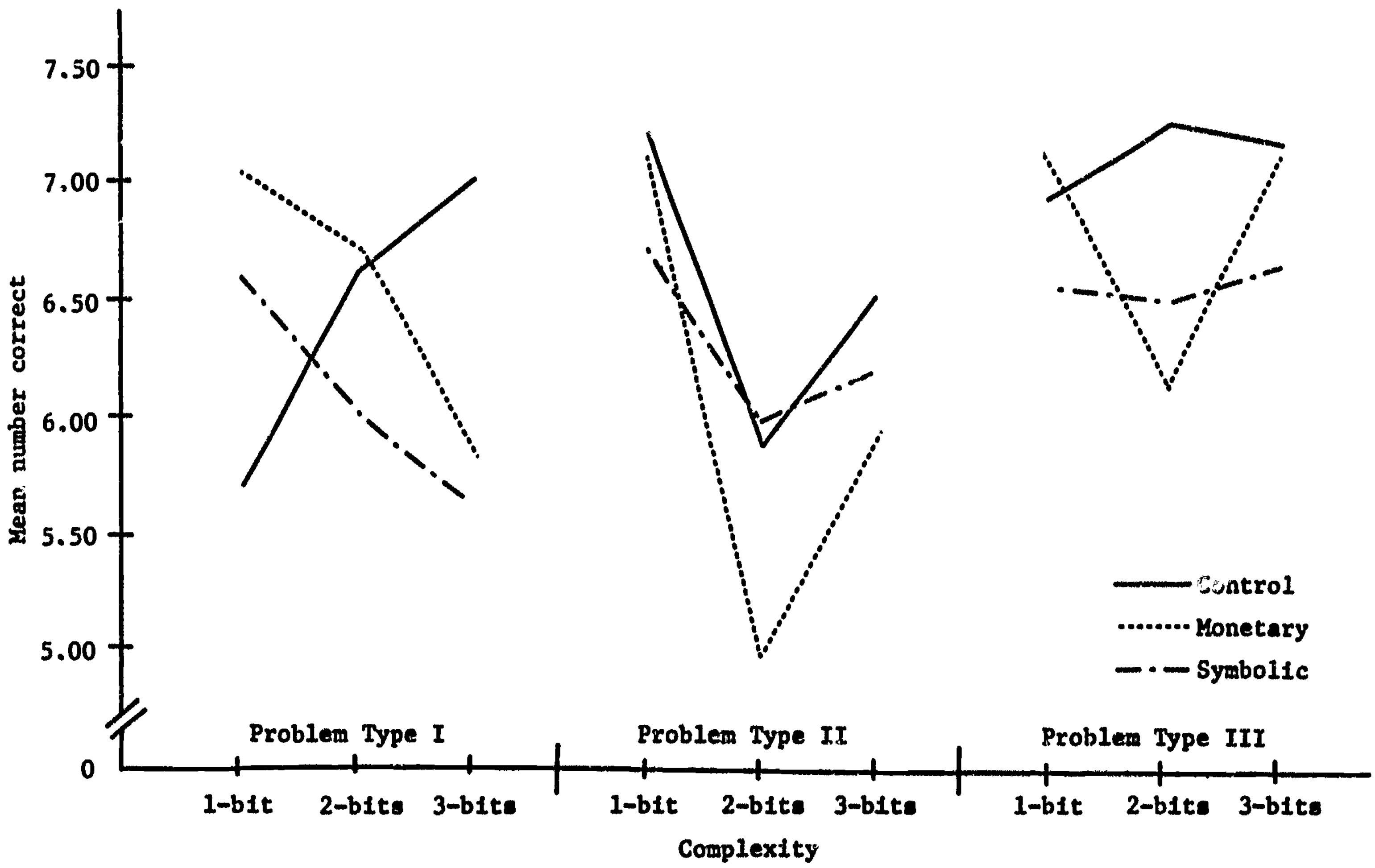

Fig. 4. Interaction of incentive × complexity for the three problem types.

V

DISCUSSION AND CONCLUSIONS

DISCUSSION

The finding that high SES Ss performed better than low SES Ss is in agreement with the results of Siller (1957), Findlay and McGuire (1957), and Graham et al., (1963). This agreement is impressive especially in view of the fact that all of the experiments utilized widely different tasks.

Although the difference between the SES groups was statistically significant, it is possible that this difference was due, in part, to a difference in intellectual ability. In order to determine whether the SES effect was due to an over-all difference in intellectual ability, a t test was performed on the mean IQ of the two SES groups. The mean IQ for the high SES group was 115.1 while the mean for the low SES group was 106.8. It was found that the mean IQ of the high SES group was significantly different from the mean IQ of the low SES group ($t = 4.825$; $df = 179$; $p < .001$). Thus, it appears that intellectual ability (as indicated by IQ measures) is related to the SES effect. This fact may lead to the conclusion that the superior performance of the high SES group was due to their higher intelligence and had little to do with their class membership.[1] Findlay and McGuire (1957) have demonstrated, however, that even when Ss from the two status groups were matched on IQ, middle-class children still performed better than lower-class children. A more plausible explanation may be that intelligence and SES together make a contribution to the superior performance of the high SES Ss. In any case, the present experimental results further confirm the importance of considering the SES of the Ss when the conceptual ability of the Ss is a factor.

A number of studies have found that as the amount of relevant information increases performance decreases (e.g., Archer, 1954; Bourne, 1963). The present study also found that performance deteriorated as the amount of relevant information increased from 1 to 2 bits. The present results, however, did not fully conform to the earlier findings since no further decrease in performance occurred when the amount of relevant information was increased from 2 to 3 bits. If anything, the 3-bit problems seemed to be easier to solve than the 2-bit problems, although the difference was not significant.

The failure to find a decrease in performance when the complexity was increased from 2 bits to 3 bits of information can be accounted for in terms of "concept size"—the total number of relevant dimensions present in a given task. Glanzer, Huttenlocher, and Clark (1963) suggested that a task is most difficult when the ratio of relevant dimensions to total dimensions is 1 to 2. Thus, an n-dimensional task will be maximally difficult when the number of relevant dimensions is $n/2$. Although this finding was based on data obtained using a Huttenlocher-type task, it can apply to other types of tasks such as that employed in the present study, which is a modification of the Bruner-board task. In both types of tasks, when the relevant dimensions are less than half of the total dimensions, the S only needs to concentrate on the NO instances to solve the problem efficiently. When the relevant dimensions are more than half the total number of dimensions, the S only needs to concentrate on the YES instances to solve the problems efficiently. Another similarity between the two tasks is in the way a S gains information from YES and NO labels on the card instances. In both cases, a NO really means the dimension just varied is relevant, and a YES instance means the dimension just varied is not relevant.

In the present experiment, the problems were set up such that the 1-bit relevant problems were equivalent to using a three-dimensional board, the 2-bit relevant problems equivalent to a four-dimensional board, and the 3-bit relevant problems equivalent to a

[1] Using IQ as the covariate, an analysis of covariance revealed a significant main effect of SES ($F = 9.37$; $df = 161$; $p < .01$). This shows that SES is a significant factor independent of IQ.

five-dimensional board. Therefore, the ratio of relevant dimensions to total dimensions in the 1-bit problems is 1 to 3, 2-bit problems 1 to 2, and the 3-bit problems 3 to 5, which confirms the finding of Glanzer et al. that the 2-bit relevant problem was the most difficult.

The failure to detect any significant effect due to incentive was not totally unexpected since Pavlik (1957), Burday (1963), and Crawford and Sidowski (1964) have reported similar findings. A number of reasons, however, can be advanced in an attempt to explain this negative finding. First, it is possible that the experimental session did not last long enough for the incentive to become a major factor. Studies which have reported significant effects due to incentive, such as Holston (1950) and Bergum and Lehr (1964), are typically long-term studies. The Ss in the Bergum and Lehr study were tested in two sessions, the first lasting 60 minutes and the second lasting 90 minutes; thus, the total testing time was two and one-half hours. The Ss in the Holston (1950) study were tested for three consecutive days in two-hour sessions. On the fourth day the experimenter offered the experimental group an increase in monetary incentive if the Ss improved their performance. Therefore, the Ss were tested for a total of eight hours. The Ss in the present experiment, by contrast, were tested for only 20 minutes.

Second, it is possible that incentives influence performance indirectly by increasing S's attention to the task. It would follow, then, that performance in monotonous or routine tasks would be facilitated by the addition of an attractive incentive. The discrimination problems used in the Terrell studies may have been interesting initially, but may have become dull and routine after a large number of trials. The incentives, however, may have stimulated the Ss to pay closer attention. It is possible that in the present experiment, attention to the task was high initially and remained so throughout the relatively short testing session. Some evidence for this hypothesis is found in the posttest questionnaire where it was found that 61.5% of the Ss rated the experiment as "interesting" and 32.8% rated it "very interesting."

Third, responses on the posttest questionnaire suggested that the Ss were highly motivated. Perhaps Ss thought that their intellectual abilities were being evaluated and consequently were motivated to do well. Also it is possible that the "Hawthorne effect" may have been operative in the experiment. Goodwin (1965) reviewed the literature on the effects of experimental atmosphere on performance and reported general agreement among the studies that the "Hawthorne effect" is, indeed, a potent variable. That is, there is a pronounced effect on a person's performance attributable to merely being involved in the experiment. Thus, for many Ss in the present experiment, merely being a participant was, in and of itself, an incentive to perform well.

There appears to be some evidence which suggests that the Ss of the present experiment were trying their best; thus offering an incentive had little influence upon their performance level. The incentive not only failed to increase performance, but Ss in the incentive groups performed poorer than Ss in the control groups, although the difference was not significant. Miller and Estes (1961) reported similar findings and suggested that Ss in the incentive groups were distracted by a preoccupation with winning the incentive which, in turn, resulted in their inferior performance. Any combination of these explanations may account for the failure to detect a significant effect of incentive.

The present experiment failed to replicate the Terrell et al. (1959) finding that lower SES Ss performed better under a material incentive while the higher SES Ss performed better under the symbolic incentive. The characteristics of the Ss might have accounted for the difference in findings between the experiments. In the Terrell et al. study, 5-, 6-, 10-, and 11-year-old Ss were used. It could be that adolescents and children do not place the same values on incentives. Differences in the nature of the task might be another variable which accounts for the difference. Trying to match the button with the correct stimulus in the Terrell experiment may be interesting initially but it gets dull and routine after a prolonged period. The novelty of the concept identification task used in the present experiment keeps the Ss' attention and the darkness of the room minimizes distractions. Another important variable operating might be the way the incentives are dispensed. If one examines the Terrell et al. methodology closely, one finds that the incentive more closely approximates a "reinforcer"—the S received a reinforcer (candy) after each correct response. As pointed out in the review chapter, immediate reinforcement for correct responses has the dual function of strengthening the response as well as providing positive feedback. In contrast to the Terrell et al. study, Ss in the present study received neither reinforcement nor feedback throughout the experiment. It

would, thus, seem reasonable that the two different procedures could account for differences in performance.

The failure of the present study to replicate the Terrell et al. result does not necessarily mean that the interaction between social class and nature of the incentive does not exist. It does suggest that such an interaction, if it exists, is not independent of such variables as age, nature of experimental tasks, and the procedures of dispensing incentives. Another important implication of this study is that future research should focus not only on the issue of whether or not there is an incentive effect, but also on identifying those conditions under which certain incentives are effective with particular types of Ss.

The significant main effect of problem type was an unexpected finding in this experiment. Subjects found Type III problems, in which number and color were irrelevant attributes, easier to solve than Type I or Type II problems. The irrelevant attributes for Type I problems were color and shape, and the irrelevant attributes for Type II problems were size and shape. Since no previously reported study analyzed for problem type as defined by irrelevant attributes, it is very difficult to account for this finding on the basis of available empirical evidence. A number of studies have, however, analyzed for the effects due to problems. For example, Heidbreder (1948) demonstrated that concepts having shape as the relevant attribute were easier to attain than concepts having number as the relevant attribute. Wolfgang, Pishkin, and Lundy (1962) failed to replicate this result. Archer (1962) found that size concepts were easier to identify than shape concepts, although he had earlier failed to detect a difference between the two types of concepts (Archer, Bourne, & Brown, 1955). The results on problem effects have not been consistent even when the same tasks were employed by the same investigators: Bourne and Pendleton (1958) reported significant effects due to problems in one experiment and no effect in a replication of the same experiment.

The first-order interaction of complexity by problem type and the second-order interaction of incentive by complexity by problem type are equally as difficult to account for. Problem type is an elusive business and, until a great deal more is known about such variables as salience and dominance of the attributes, any attempt to account for the effects due to problem will more likely confuse the issue than clarify it. In the absence of meaningful explanations, we may tentatively conclude that the problem effect and the interactions associated with it are either an artifact or the result of some unidentified variable.

CONCLUSIONS

It was pointed out in the introductory chapter that this experiment sought answers to four specific questions. These questions will be restated and the conclusions reached on the basis of the results presented.

QUESTION 1. What is the relationship between SES and performance in concept identification task?

Performance of the high SES Ss was superior to that of the low SES Ss across incentive and complexity levels. It was suggested in the discussion section that the higher mean IQ of the high SES Ss may have some effect on their superior performance.

QUESTION 2. What is the effect of an incentive upon the performance of Ss in a concept identification task?

The findings of this study indicate that incentives had no significant effect on the Ss' performance. Discussion of this unexpected finding considered the possibility that the short-term feature of the experiment did not allow for the incentive to take effect. The high motivational level of the participating Ss was also suggested as a contributing factor to this negative finding.

QUESTION 3. What is the effect of the complexity of the task on the performance of Ss on a concept identification task?

The result of the experiment indicated that as task complexity increased from 1 to 2 bits of relevant information, performance deteriorated. The 2- and 3-bit problems, however, did not differ.

QUESTION 4. Which of the following interactions are significant? (a) Interaction of incentive by SES. (b) Interaction of incentive by complexity. (c) Interaction of SES by complexity. (d) Interaction of incentive by SES by complexity.

None of the interactions were significant. Monetary incentive and symbolic incentive did not exert differential effect on the perfor-

mance of Ss from the two SES levels. It was suggested that the following may have contributed to the negative results: age, nature of the task, and procedure of dispensing incentives. Increases in task complexity did not result in any significant effects of incentives.

Although the results demonstrated that high SES Ss performed significantly better than the low SES Ss, increases in task complexity did not differentially decrease the performance scores of the two social groups. The interaction of SES by incentive by complexity was not significant.

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APPENDIX

POSTTEST QUESTIONNAIRE

Name_________________Grade___________
(Please Print)

In each of the following items, please check one answer. Please be very truthful with your answers.

(1) The experiment I have just participated in was
___very easy; ___easy; ___difficult;
___very difficult.

(2) The experiment was
___very interesting;___interesting;
___boring;___very boring

(3) Are the instructions clear enough ?
___Yes; ___No

(4) Did you have enough time to decide what each group was ?
Group I ___Yes; ___ No
Group II___Yes; ___No
Group III___Yes; ___No

(5) Did you guess any of the answers ?
___Yes; ___No

(6) Did you guess all the answers ?
___Yes; ___No

(7) How well do you think you did in this experiment ?
___very well; ___well; ___poor;
___very poor

(8) How much do you like to win the prize ?
___very much; ___much; ___a little;
___not at all

(9) How much do you think the other participants like to win the prize ?
___very much; ___fairly much; ___a little;
___not at all

(10) What do you think are your chances of winning the prize ?
___excellent; ___good; ___poor;
___no chance

(11) Check (a) or (b)
(a)___I would rather do something for the fun of it
(b)___I would rather do something if I am promised something for it.

Write any comments you may have about this experiment.

Remember, please do <u>not</u> talk to anyone about this experiment. Thank you.